examined twenty-four hours after the cessation of the flow externally, but in which the uterus (removed) still contained some bloody mucus, the tubal secretion was free from blood, thus suggesting that the menstrual process begins in the tubal membrane, and spreads downwards to the uterus, and ceases in the like order.

The presence of bloodstained mucus-like menstrual fluid in the lower portions of the Fallopian tubes during uterine menstruation having been thus shown to occur in some cases, the question arises whether it originates in the tubes, or is due to backward regurgitation from the uterine cavity.

This latter is a conceivable explanation, especially as in some of the cases in which the tubes were removed mechanical conditions, such as retroversion, were present, which might possibly favour such a process. Against this explanation is the fact that:

1. The secretion appears so early in the tubes coinciding with or even preceding the appearance of the flow externally.
2. That definite changes are found in the Fallopian mucous membrane itself.
3. Examinations of the uterus in women dying during menstruation are not common. But in a case of a young girl with healthy uterus in which at the *post-mortem* examination made ten hours after death the uterus contained menstrual fluid, blood-stained mucus was also found in the Fallopian tubes.
4. In cases of imperforate hymen with uterine distension, backward regurgitation does not occur, as a rule, into the Fallopian tubes unless there be infection and the contents be purulent.
5. Experimental evidence derived from the study of the subject in animals shows that no backward regurgitation from uterus to Fallopian tubes occurs; this forms the subject of further research, and will be brought forward later.

Assuming, then, that the fluid originates in the Fallopian tubes as a true Fallopian menstruation, this at first sight seems at variance with the established fact that the fluid of a hydrosalpinx, or the accumulated secretion in a blocked and distended tube is a colourless watery fluid containing no blood. I have, however, ascertained that such fluid contains a very large percentage of chloride of sodium in solution; this has a marked effect in breaking up red corpuscles and liberating hæmoglobin, which may be thus absorbed. Possibly, also, a very slight increase of intra-tubular pressure, if constant, such as would arise early in a commencing hydrosalpinx, is sufficient to arrest the menstrual process in the very delicate tubal mucosa.

A case also occurs to me in which, after an abdominal section for tuberculous peritonitis in a young girl, a sinus remained, leading down to the pelvis. In this case the uterus was healthy, and there was no stenosis of os, or retroversion. A bloodstained discharge, menstrual in character, however, appeared at the sinus at the beginning of the menstrual period on several occasions until the sinus closed. This must have come from the open end of the Fallopian tube. Whatever be the true explanation, however, of the presence of blood in the Fallopian tubes in the human female during menstruation, a somewhat prolonged inquiry in the case of the lower mammalia, which I hope to publish later, has demonstrated the fact that in these cases the tubal mucosa as well as the uterine participates in the increased vascular engorgement, the increased leucocytosis, and the increased secretion, the three factors which accompany ovulation, and constitute the essential characteristics of the periods of sexual activity.

There are other interesting and suggestive points in the normal uterine and tubal secretion in animals, both in the ordinary condition, in pregnancy, and in artificial conditions experimentally produced, which have come out in the course of this investigation, which I hope to publish elsewhere, and of which a preliminary note has appeared in the *Journal of Physiology*.

The occurrence of menstruation in the Fallopian tubes has an important bearing on certain points in human pathology. It is, for instance, possible that an abnormal menstruation in a tube may predispose to the occurrence of extrauterine or tubal pregnancy by providing a surface on which the ovum in its passage through the tube may become grafted. It is I think likely that much of the pain of dysmenorrhœa is tubal in origin, and due to tubal colic, or

efforts to expel the tenacious bloody mucus, especially in those cases in which the pain precedes and coincides with the first day or two of the establishment of the flow. It may also throw light on certain cases of recurring local pelvic peritonitis in which the inflammatory process is started by exudation from the fimbriated opening of the tubes of tubal secretion at the menstrual period, even in the absence of gonorrhœa and other infective processes.

The occurrence of tubal menstruation, too, has an important bearing on certain cases of hæmato-salpinx, in which careful search fails to reveal the presence of any tubal pregnancy.

THE ACTION OF THE VAGINAL PLUG IN ACCIDENTAL HÆMORRHAGE.*

By E. HASTINGS TWEEDY, F.R.C.P.I., ETC.,

Gynæcologist to Dr. Stevens's Hospital, Dublin; formerly Assistant Master Rotunda Hospital.

ACCIDENTAL hæmorrhage is one of the few complications in midwifery concerning which a marked disagreement as regards treatment exists. Before discussing this question, however, it is well to draw a distinction between those hæmorrhages associated with an atonic uterus and those not so associated.

In the absence of labour, the diagnosis between these conditions may present some difficulty; but should labour be in progress, the presence or absence of a contracting uterus will at once decide the point.

If labour pains are strong and the os dilated the prognosis is decidedly good, and to rupture the membranes or turn and bring down a foot will as a rule suffice. Forceps may at times be indicated, and even *accouchement forcé* can under the circumstances be often successfully accomplished. But in the presence of an atonic or inert uterus with a long uncontracted cervix and a partially-opened os, how can we hope to improve matters by any of the above proceedings?

Rupture of the membranes, with or without podalic version, does not excite the uterus to contract for many hours; the hæmorrhage, therefore, is most likely to continue, and the operator, in spite of his better judgment, is not infrequently compelled to employ forcible dilatation of the cervix and rapid delivery.

In doing this, the cervix is liable to be torn, and large branches of the uterine artery to be laid open, but even should the latter accident be avoided, the performance of forced delivery produces a condition of shock which proves but too frequently greater than the patient can bear. It is no exaggeration to say that the performance of Porro's operation even would, under the circumstances, be a less hazardous proceeding. In the vaginal plug, however, we have an alternative to the above line of treatment capable, I believe, of obviating the worst dangers arising from accidental hæmorrhage.

It is curious to note that on few devices has greater obloquy been heaped than on this, and yet it seemed to Dr. Smyly during the latter years of his Mastership in the Rotunda Hospital to present fewer disadvantages than any other proceeding, and accordingly it became the "routine" treatment in that institution. Dr. Smyly dealt with this subject in a paper read before the Obstetrical Section of the British Medical Association at the annual meeting held in Bristol, and in it maintained that a properly-applied tampon prevented external bleeding, excited labour pains, and induced rapid dilatation of the os, this latter taking place without any fear of laceration or loss of its single layer of epithelium so necessary to it, as a barrier against germ invasion. He also stated that in the event of concealed hæmorrhage still flowing, the intrauterine tension would thereby be increased, and a greater and greater difficulty would thus arise against a systemic leak, and that this would be more readily brought about were a tight abdominal binder also applied. He did not advocate the plug save when the membranes were intact, a condition of course found in the majority of cases.

Few I think will deny any of the claims so far made in

* Read before the Section of Obstetrics, Royal Academy of Medicine in Ireland.

favour of the vaginal plug, but its action is more far-reaching, I believe, than Dr. Smyly has contended; for it acts not alone in the manner he states, but also, and above all, as a tourniquet to the uterine arteries.

If the cervix is fixed, and at the same time forcible pressure exerted on the vault of the vagina in the region of the lateral fornices, the uterine arteries become acutely bent and their blood flow impeded. This is probably brought about by the drag exerted on them through their cervical branches.

On the pregnant cadaver I have had but one opportunity of verifying this statement, and here shortly after death I easily induced this bending by exerting firm pressure in the lateral fornices. Other proofs, however, are forthcoming in support of my contention. Hysterectomy by Doyen's method furnishes us with an example of the complete manner in which the uterine circulation can be controlled by a down drag exerted on the cervix. And finally, there is abundant clinical evidence to show that blood to any serious extent does not form above a properly fitted tampon.

I am aware that this statement will not meet with universal assent, for, as a matter of fact, many cases of death have been recorded where this treatment was employed. But was the tampon properly applied in these cases? I think not.

In the discussion which followed the reading of Dr. Smyly's paper, one gentleman of great eminence stated that he carried a boiled sponge in his bag for the purpose of plugging the vagina, another stated that he preferred his silk pocket handkerchief. In other cases I have seen tenax, dry cotton wool, dry iodoform gauze, and a torn shirt used for the purposes of a tampon. With examples such as these before me I trust I shall not be considered presumptuous in assuming that the proper material to use or the proper mode of its application is not universally known.

To accomplish this little operation in a satisfactory manner many pieces of sterilised cotton wool are required, each the size of a small closed fist, and should be placed in a weak antiseptic solution. The patient is then brought out to the edge of the bed, put lying on her left side, and when the vulva and vagina have been aseptically, and the bladder emptied, the pieces of cotton wool are taken one by one, squeezed of their superfluous fluid, compressed into a comparatively small compass, and inserted without the aid of a speculum in such a manner that the entire cervix is surrounded by pledgets before the os is covered. Each piece is packed as tightly as possible, and then the vagina is filled to its utmost capacity down to the urethra, a diaper placed between the thighs, and a tight abdominal binder complete the operation.

It is simply astonishing the amount of cotton wool that can be introduced in this manner, and how hard and incompressible such a plug becomes, and it is in favour of such a tampon only that I contend.

Hæmorrhage ceases when it is thus inserted. The cervix safely and rapidly dilates in a manner much to be preferred to that accomplished by hydrostatic bags. Labour pains, moreover, are induced quickly. This latter effect is probably in great part to be accounted for by the inevitable accumulation of carbonic dioxide gas which must form in the uterine muscle in consequence of the obstruction in its vessels caused by the tampon.

The cervix, though becoming dilatable, does not always dilate, nor is it drawn up until the plugs have been removed, and so markedly was this a fact in one of my cases, that though the os when first felt while removing the pledgets did not appear to have a greater diameter than a two-shilling piece, it had nevertheless fully dilated before the end of the operation, a period of not more than two minutes having elapsed between the two observations. In fact, it seemed to spring open when once the restraining pledgets were taken away.

Nor is the tampon applicable to those cases alone in which the membranes are intact, for the circulation in the uterine vessels is still controlled even after their rupture.

I have not seen any case in which hæmorrhage continued in spite of this treatment, though one woman unfortunately died shortly after I had inserted the plugs. Her history is briefly this, the case occurring in the out-patient maternity department of the Rotunda Hospital. She was at first attended by the night students on

duty, who promptly summoned the clinical clerk, and when eventually I saw her she was in a condition of extreme collapse, with blood still freely flowing through an inefficient tampon. This was immediately removed, and a new one placed in position; then an intravenous injection of several pints of saline solution was administered. She died suddenly two hours later, from shock, no hæmorrhage having either passed through or been extravasated above the tampon, and this in spite of the large quantity of saline solution injected. How could the hæmorrhage have ceased in this case were the circulation in the uterine vessels not directly interfered with?

The conclusions arrived at here are as follows:

1. The vaginal tampon, when properly applied, is the most suitable treatment we possess for the worst forms of accidental hæmorrhage.

2. It may be relied on as sufficient in the majority of cases not amenable to other treatment.

3. It controls the circulation in the uterine arteries, acting in much the same manner as does a tourniquet.

4. It dilates the cervix partly by exercising a peripheral force on that structure, and in part by exciting uterine contractions.

5. These latter are induced not alone as a consequence of cervical dilatation, but are chiefly attributable to the power the tampon possesses in bringing about an accumulation of carbonic acid gas in the uterus.

A CASE OF PLASTIC OPERATIONS FOR BURNS.*

By RODERICK MACLAREN, M.D.,

Senior Surgeon to the Cumberland Infirmary, Carlisle.

USUALLY a surgical operation means one proceeding for a definite object, which either succeeds or fails; but occasionally, though rarely, it may involve a series of steps not all directly conducing to the ultimate result, some even apparently leading away from it. Such cases are generally of considerable interest, and the story of one which has just passed from my care seems worth telling.

Five years ago R. M., a girl aged 10, was admitted to the Cumberland Infirmary. Six weeks previously her clothes caught fire, and she was severely burned over the area to be described presently. She had been carefully treated outside by my friend Dr. MacLachlan, of Longtown. All charred skin had separated and the burnt surface was covered by healthy granulations. This granulating surface extended round the whole right arm and forearm from the middle of the deltoid to near the wrist; it involved the right side of the chest from the axillary line above to the margin of the ribs below, and from within 3 inches of the sternum in front to the same distance from the spine behind; the entire axilla was denuded and raw. The whole thickness of the skin appeared to have been destroyed over a considerable part of this area; the burning was greatest in the neighbourhood of the elbow-joint, and the tip of the olecranon was slightly bared. It was a matter of doubt when so large a surface would heal and whether the child's strength would support the drain from such an extensive suppurating area. The advisability of amputating the arm just below the shoulder was given due consideration. The arguments in its favour were that a large part of the suppurating surface was got rid of at once, and that the limb looked as if it would be of little use, even if healing occurred. However, as there seemed a possibility of getting a better result, it was decided to attempt this in the first instance. For the sake of diminishing the raw surface I had the arm bandaged to the side. Quick adhesion occurred, binding the arm to the thorax, thus diminishing the raw surface by a third.

The case progressed rapidly, and in four months healing had taken place except in a small area over the point of the elbow. In nine months complete healing had occurred. The arm was adherent to the side, and the cicatricial skin was continuous over the thorax and arm. I then proceeded to carry out the second stage of her treatment.

Two skin flaps were dissected from the wall of the upper

* Read before the Border Counties Branch of the British Medical Association.